

## In this issue...

The New Year Begins	1
COs Messages	2
NMRC New Year Navy Baby Announcement/Scrubbing In	3
Navy Researchers Collaborate on Five-year Dengue Study	4
NAMRU-D Strengthens Old NASA Ties	5
Navy Researchers continue Overseas Deployment Collaborations	6
Deployed to Bong County, Liberia	7
DoD Releases Ebola Response Breakdown	8
NAMRU-2 Trains Medics from Royal Cambodian Navy	9
R&D Chronicles	10
Israeli Air Force Surgeon General Visits NAMRU-D	11
NHRC Concludes Six-year Vaccine Study with FDA	13

More stories inside

*NMR&D News* is an authorized publication of the Naval Medical Research Center, 503 Robert Grant Avenue, Silver Spring, MD 20910. *NMR&D News* is published monthly by the NMRC Public Affairs Office, 301-319-9378 or [svc.pao.nmrc@med.navy.mil](mailto:svc.pao.nmrc@med.navy.mil)

Commanding Officer  
Capt. John W. Sanders

Executive Officer  
Capt. Elizabeth Montcalm-Smith

Director for Administration  
Steven S. Legette

Public Affairs Officer  
Doris Ryan

Graphic Layout & Design Editor  
Mikelle D. Smith

<http://www.facebook.com/naulmedicalresearchcenter>



Use your  
smartphone to  
access our website!

## The New Year Begins!

Naval Medical Research Unit-Dayton's 2015 Logbook Entry  
Entered by Capt. Rees L. Lee, Executive Officer, NAMRU-Dayton

The year begins at NAMRU-D

With great anticipation for upcoming great deeds.

Reducing pilot disorientation in the air, is a goal most fair.

And soon we will have a new DRD!

Round and round it will go

Planetary, vertical and horizontal motions galore.

Making our subjects' eyes spin, provides the data we need to win.

But mess up our new Kraken we will not, no spewing allowed on this spot.

Our scientists will bring all their tools to bear

To answer the questions of NAVAIR.

Normobaric Chamber, ROBD and Barany chair, Flight sims, Lasers and other toys

All aim to make us safe in the air

And if this makes you too fatigued

Dr. Caldwell's sleep lab is probably what you need.

Rats and mice are our friends

In determining toxicology ends.

You may ask: Is it safe to fuel a jet?

Or will it irritate my temperament?

Best are we at this inquiry, for inhalation research is our specialty.

And if the animals are too much for you, cells *in vitro* may serve instead.

To answer the question in your head. GC, Mass Spec and HPLC,

Are just a few of the machines we use, to allow our scientists to see.

A tradition, not as well-known as other naval traditions, is the first entry in the Deck Log for the New Year be written as a poem. On Navy ships and onshore stations around the world as Sailors stand watch marking the arrival of the New Year a poem can be the first log entry.

But nothing happens without the skills  
Of experts in Finance and Admin support.

Functioning as a family is our goal

So that "When Work Works" nothing is impossible.

NAMRU-D is at flank speed,  
course set straight and true.

And staffed with the best research crew.

Please accept the first WAR report from NAMRU-D

As a promise of more to come,

And assurance that we will be the star of R&D.



## NMRC Commanding Officer's Message



2014 was a great year for Navy Medicine Research and Development and I think 2015 is going to be even better. I highlighted a few of the enterprise accomplishments last month, but I want to direct your attention to the "U.S. Navy 2014 Year in Review," which you can find by clicking on this link to our [Facebook page](#). We've had personnel from NMRC, NAMRU-2, NAMRU-3, and NAMRU-6 deployed to Liberia and it is great to see their efforts highlighted as a major Navy accomplishment. Of course, work in Liberia and elsewhere is continuing into 2015. For some great examples, I refer you to the latest issue of "Scrubbing In" which focuses on several of the ongoing efforts at NMRC.

The New Year is going to bring many changes including some changes in leadership. The Surgeon General recently released his slate of new Commanding Officers and Executive Officers. This year CAPT Jacqueline Rychnovsky will become the CO and CAPT Eric Hall will become the XO at the Naval Medical Research Center. CAPT Rita Simmons will become the CO at the Naval Health Research Center. CAPT Frederick Yeo will become the CO and CDR Thomas Herzig will become the XO at the Naval Submarine Medical Research Laboratory. CAPT Elizabeth Montcalm-Smith will become the CO at the Naval Medical Research Unit – San Antonio. CAPT Marva Wheeler will become the CO at the Naval Medical Research Unit No. 2. CAPT Adam Armstrong will become the CO and CDR Guillermo Pimentel will be the XO at the U.S. Naval Medical Research Unit No. 6. I want to congratulate each of these officers and I am very excited about what they will be bringing to their new commands and positions.

NMRC Commanding Officer sends,  
John. W. Sanders III, CAPT, MC, USN

## NMRC-Asia Commanding Officer's Message

As we start a new year I look back on 2014 and reflect on the challenges, successes and opportunities NAMRU-2 experienced as we re-established ourselves in Southeast Asia. Relocating a command comes with many inherent hurdles to which we were not immune. Coupling local support from the U.S. Embassy and Navy Region Center Singapore with the tremendous effort of our staff here and at NMRC, NAMRU-2 is now able to focus on its mission of combating critical infectious diseases important to the U.S. and our regional partners. While our Cambodia Detachment performed superbly expanding research and training initiatives throughout the country, we have extended regionally by strengthening collaborations with civilian and military partners across Vietnam, Laos, Malaysia, Thailand and the Philippines. Vietnam has set a 2030 malaria elimination goal and NAMRU-2 is partnering to identify malaria transmission and drug-resistance patterns in the country.



These efforts, led by LCDR Nicholas Martin, are highlighted by a \$2.1M collaborative project with the University of California, San Francisco (UCSF); and the Vietnam National Institute of Malariology, Parasitology and Entomology to identify areas most at risk for malaria transmission. With Vietnamese Ministry of Health approval and a \$5M grant to UCSF by the Bill and Melinda Gates Foundation, the team will pilot enhanced and novel malaria control strategies in 2015. NAMRU-2 is also working with the Military Institute of Preventive Medicine to evaluate malaria drug-resistance in the Phuoc Chien commune of Central Vietnam. LCDR Ian Sutherland has been instrumental in leading joint entomology surveys of the site to help elucidate local malaria transmission patterns.

Additionally, LCDR Sutherland developed vital collaborations in Laos with the Ministry of Health; Pasteur Institute; and the Center for Malariology, Parasitology, and Entomology in Vientiane. Together they are conducting active surveillance of dengue and malaria; extending training opportunities to the local military, and identifying new pathogens and vectors endemic to the region. It was an exciting year at NAMRU-2 and I look forward to an even better 2015. We continue to work with USPACOM, USPACFLT and Navy Medicine to align strategies for building partnerships in the region to combat infectious diseases and help promote theater security cooperation.

NMRC-Asia Commanding Officer sends,  
Marshall Monteville, CAPT, MSC, USN







# Navy Researchers Collaborate on Five-year Dengue Study in Peru to Begin in 2015

Story by Lt. Robert D. Hontz, NAMRU-6

LIMA, Peru - After many years of researching dengue disease epidemiology, investigators are just now beginning to understand in greater detail the underlying mechanisms and trends directing such outbreaks.

It is well known that the dengue virus (DENV)-infected female mosquito of the species *Aedes aegypti*, transfers the virus to humans while blood feeding; however, evidence is not yet available as to how efficiently DENV-infected people are able to transmit the virus to healthy mosquitoes. Since *Aedes aegypti* mosquitoes only travel relatively short distances during their lifetimes (~100 meter radius), it is logical that dengue outbreaks would spread over large distances primarily by human movement, where infected individuals are bitten by healthy mosquitoes.

A University of California, Davis (UC-Davis)/U.S. Naval Medical Research Unit No. 6 (NAMRU-6) collaborative study published in the Proceedings of the National Academy of Sciences (PNAS) provided evidence that human movement contributes to the spread of DENV infections starting outbreaks.

Two important questions remain: to what extent can DENV-positive persons infect healthy mosquitoes? And, what impact does this have on disease transmission to eventually spark outbreaks?

This National Institutes of Health-funded five-year project, managed by Dr. Thomas W. Scott of UC-Davis, will address these questions using novel field methods, laboratory techniques, and advanced computer modeling programs.

Subject-matter-experts from NAMRU-6 and nearly a dozen academic institutions, will carry out this work exclusively in the Peruvian city of Iquitos, where UC-Davis and NAMRU-6 have been conducting dengue disease surveillance for two decades.



*The City of Iquitos, Peru. (Photo courtesy of NAMRU-6 Public Affairs)*

Investigators will lend their expertise in the fields of epidemiology, infectious disease ecology, clinical medicine, virology, immunology, entomology, behavioral science and mathematical modeling ... making it truly an interdisciplinary and transdisciplinary project.

Three smaller projects called “cores,” will focus on specific aims that relate to the overall goal. The purpose of the first core is to quantitatively define the relationship between disease severity and the variation of a person’s contribution to infect healthy mosquitoes.

The second core will assess the relative and joint contributions of epidemiological, entomological and socio-behavioral heterogeneity to DENV transmission dynamics. The third core will analyze data from the first two cores in order to predict risk and target effective public health measures to minimize DENV spread.

Over the next several years, NAMRU-6 scientists and clinicians will be on the front lines of this valuable research effort, whose recommendations for more effective public health measures to combat dengue disease,

will better protect the warfighter deployed to high risk locations.

According to the U.S. Centers for Disease Control and Prevention (CDC), more than one-third of the world’s population live in areas at risk for contracting dengue. Dengue has emerged as a worldwide problem only since the 1950s. Dengue is a leading cause of illness and death in tropical and subtropical regions, with approximately 400 million new infections annually. Dengue is caused by any one of four related viruses transmitted by *Aedes* mosquitoes. There are currently no vaccines to prevent dengue infection, so protective measures to avoid mosquito bites are the most effective way to prevent contracting the disease.

When infected, early recognition and prompt supportive treatment can substantially lower the risk of medical complications and death. Although dengue disease is rare within in the continental United States, it is endemic to Puerto Rico and many popular Latin American, southeast Asian and Pacific island tourist destinations.

# NAMRU-D Strengthens Old Ties with NASA

Story by Richard D. Arnold, NAMRU-D

DAYTON, Ohio - Visitors to Naval Medical Research Unit-Dayton's (NAMRU-D) Aeromedical Directorate will still find a few mementos of the lab's key role in the nation's early manned space program.

In preparation for manned space flight (in the late 1950s) the lab's Research Director, Capt. Ashton Graybiel, established a program of biomedical research focused on problems in space medicine.

The lab was then a department of the USN School of Aviation Medicine and subsequently established as an independent laboratory, the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, Florida, in 1970.

From 1950 to 1986, NAMRL and Graybiel played a key role in the U.S. space program by conducting groundbreaking aeromedical research to enhance the health, safety and performance of NASA astronauts.

May 28, 1959, a squirrel monkey from the NAMRL laboratory, Miss Baker, became one of the first two primates launched into space and successfully recovered.

Her travel partner, an Army rhesus monkey named Miss Able, died four days later. Miss Baker became a national celebrity and remained a local celebrity in Pensacola, where a parade was held each year on her "birthday." In 1971 she was transferred from NAMRL to the U.S. Space and Rocket Center in Huntsville, Alabama, where she lived until her death in 1984.

Other important work performed at the lab in Pensacola included familiarization training for the Mercury astronauts to prepare them for acceleration and gravitational extremes they would experience in space flight; collaborative work with NASA on the first space suits and pharmaceutical research to combat space motion sickness.

Graybiel remained at the core of the lab's partnership with NASA for many decades.



*NAMRL's lab squirrel monkey, Miss Baker, was one of the first two primates launched into space and successfully recovered May 28, 1959. (Photo courtesy of NAMRU-D Public Affairs)*

After his retirement from Naval service in 1966, he remained at the lab as scientific director until his retirement from civil service in 1986.

NAMRL continued various collaborations with NASA after Graybiel's retirement, though the partnership diminished somewhat due to the loss of its principal driving force.

In 2011 the laboratory moved to Wright-Patterson Air Force Base, Ohio, as directed by the 2005 Base Realignment and Closure Act. As NAMRU-D grows back into its mission, NASA is once again becoming a key research partner.

NAMRU-D is partnering with NASA and Epiomed Therapeutics to test intranasally-delivered scopolamine against space motion sickness and other forms of motion sickness.

Recently, NAMRU-D and NASA Langley Research Center signed an interagency agreement to conduct collaborative research on mitigation of pilot spatial disorientation, the leading aeromedical threat in military, commercial and civil

aviation.

This new work will be supported by NAMRU-D's new Disorientation Research Device (DRD), a one-of-a-kind research platform that is expected to provide a foundation for the next generation of research into problems of pilot spatial disorientation, related vestibular and acceleration problems.

It is also hoped to provide one more foundation for the reestablishment of the lab's special relationship with NASA.

The mission of NAMRU-D is to maximize warfighter performance and survivability through world-class aeromedical and environmental health research by delivering solutions to the field, the Fleet and for the future.



# Navy Researchers continue Overseas Collaborations at Deployment Sites in Kenya and Honduras

Story courtesy of Naval Medical Research Center Public Affairs



Cmdr. Ramiro Gutierrez spent two weeks in Soto Cano Air Base, Honduras, as a site investigator supporting field trials aimed at improving treatment and prevention of travelers' diarrhea. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md. – Last month Cmdr. Ramiro Gutierrez, from the Naval Medical Research Center's (NMRC) Enteric Diseases Department (EDD) spent two weeks in Soto Cano Air Base, Honduras, as a site investigator supporting field trials aimed at improving the treatment and prevention of travelers' diarrhea (TD) among deployed personnel.

"Joint Task Force-Bravo, located at Soto Cano Air Base in Honduras operates air and other operations maintaining a forward presence in order to enhance regional security, stability and cooperation," said Gutierrez. "Over the last year, Soto Cano was activated as the fourth site to take part in an antibiotic treatment study. TrEAT TD is a randomized double-blind field trial aimed at determining optimal single-dose therapies for active duty personnel with travelers' diarrhea. This study is led by Cmdr. Mark Riddle, also from EDD."

For this study researchers are evaluating single dose regimens to be used to treat febrile diarrhea/dysentery or acute watery diarrhea. For watery diarrhea the three regimens include azithromycin, levofloxacin or rifaximin (all with loperamide). For fever/dysentery the

regimens are azithromycin with or without loperamide.

British Army Training Unit Kenya, Africa; Camp Bastion-Afghanistan, and Camp Lemonnier, Djibouti are the other three sites.

While in Honduras, Gutierrez enrolled, treated and followed study subjects in the TrEAT TD study. Gutierrez also is the principal investigator for another research project called Prevent TD, a multi-site, randomized, placebo-controlled, diarrhea field trial, which will evaluate the non-absorbable antibiotic rifaximin as chemoprophylaxis for travelers' diarrhea. While in Honduras he met with base leadership, other personnel and potential participants in both studies.

In January, Gutierrez and an Infectious Diseases Clinical Research Program (IDCRP) team of investigators will conduct meetings with their British Army Medical counterparts in London to plan future collaborations such as Prevent TD.

According to Gutierrez, despite sanitation and other measures, deployed personnel suffer high rates of travelers' diarrhea. The incidence appears to be highest during

operationally dynamic periods and has continued to result in significant rates of disease during recent military operations abroad.

Progress in the development of a vaccine which targets the most common travelers' diarrhea pathogens (diarrheagenic *E.coli*, *Campylobacter* and *Shigella*) remains a priority and continues to be a focus of NMRC and the Walter Reed Army Institute of Research (WRAIR) enteric research efforts; but, a final product with the required valency and efficacy characteristics remains years away. Until a vaccine is available, other strategies need further evaluation to include chemoprophylactic strategies.

The follow-on trial to TrEAT TD, Prevent TD, will test the protective efficacy of the non-absorbable antibiotic, rifaximin, against travelers' diarrhea for active duty personnel on short deployments. Prevent TD, like TrEAT TD, will include both U.S. and British personnel located at multiple deployment locations but will focus on British troops on training in Kenya and U.S. personnel deployed to Asia and Soto Cano AB Honduras.

(continued on page 12)

# Bong County, Liberia, Navy Mobile Lab: A Personal Perspective

*Account by Lt. James Regeimbal Jr.,  
Microbiologist, First Mobile Laboratory Team  
in Liberia*

Liberia - Stepping off the helicopter onto a dusty field in Bong County, the contrast with Monrovia could not be more stark. Monrovia, the capital city of Liberia, located in Montserrado County, is a city of concrete and glass; with all the sounds and smells of any major city.

Monrovia also had several Ebola Virus Disease (EVD) testing labs, as was appropriate given the city's high population; but, the outer rural counties were a different matter. Central and Southern Liberia were struggling to control EVD just like Monrovia, but there were no EVD testing labs that far out.

The outer counties shipped their samples into Monrovia and if the samples were not lost in transit, would wait up to seven days for results. That is what brought us to Bong County and that dusty field was our first introduction. Bong in the rainy season is very hot, very green and very austere. Instead of a busy city backdrop, we were surrounded by the friendly faces of farmers and a dense jungle.

The lab was set up in 48 hours and immediately the first samples were delivered, because the Ebola Treatment Unit (ETU) in Bong had been eagerly awaiting our arrival. Processing the first sets of samples was sobering. There were faces behind these little tubes of blood, and our work had a direct impact on them.

Our rapid EVD testing shrank the turnaround for results from seven days to just four hours. That decrease meant better patient triage, more efficient operations at the ETU and a significant decrease in the spread of the virus in the suspect ward. Our rapid tests also encouraged more folks who were sick to seek help and were used to inform when convalescent patients could be released to return to their families.

You have never seen joy until you have seen it on the face of an Ebola survivor. News of the Bong lab quickly spread to other ETUs, hospitals and safe burial



*U.S. Navy Lt. James Regeimbal decontaminates and inspects sample documentation received at a Naval Medical Research Center mobile laboratories in Liberia, Oct. 7, 2014. (Photo taken by Chief Hospital Corpsman Jerrold Diederich, U.S. Army Africa)*

teams. During the first 60 days of Operation United Assistance we were the only lab accessible to rural Liberia testing samples for seven of the large outer counties. Our location and rapid testing meant that all the outer counties could get same-day results.

The work was very hot, the PPE was at times stifling and dramatically reduced fine motor skills in your hands, and any given sample may have been filled with trillions of copies of Ebola; but, like anything you find a groove.

A typical day in the lab meant chaotic and irregular sample deliveries from numerous sources all over central and southern Liberia. But once inside our lab, it was a monument to monotony.

Every don and doff of PPE; every sample; every step in the protocol; every day, was exactly the same. Time seemed to fly and stand still at the same time. The routine was either sweaty meticulous work in PPE with Ebola, or soul crushing boredom waiting for more samples. We absolutely loved it. And all those samples later, the previously overflowing ETUs in Bong County now have less than five patients between them.

There is also a dramatic decline in cases throughout the country and that trend seems to be continuing. And although the work continues, we hope we helped.



# DoD Releases Breakdown of Ebola Response Effort

Story by Claudette Roulo, DoD News, Defense Media Activity

WASHINGTON – The Defense Department released a breakdown of the numbers of DoD personnel involved in the battle to stop the spread of Ebola.

The efforts, led by the U.S. Agency for International Development, involve 2,367 DoD personnel, said Pentagon spokesman Army Col. Steve Warren. Most of those personnel -- 2,174 -- are based in Monrovia, Liberia's capital city. The remaining 193 personnel are Marine Corps members and port operations personnel operating in Dakar, Senegal.

U.S. military personnel are not involved in treating patients with Ebola, defense officials have said. Their role in the fight is to provide logistical support and training for health care workers, to test medical samples and to construct Ebola treatment units. Since training began Oct. 27, the 40-person Army and Air Force team has trained 1,539 health care workers.

Personnel breakdown by area: -- Liberia: Army – 1,829, Air Force – 48, Navy – 31, Marine Corps – 1, contractors – 166, civilians – 23; -- Senegal: Army – 86, Air Force – 90, contractors – 13, civilians – 4.

## Medical Treatment Facilities

The department's efforts in Liberia also include a 25-bed hospital in Monrovia and 10 Ebola treatment units located throughout the country. Construction of all but two of the Ebola treatment units is now complete, Warren said. Initially, the treatment units were all intended to have capacities of 100 patients each, but as conditions on the ground changed, the final seven units were built to hold 50 patients each.

Since opening Nov. 7, the hospital -- known as Monrovia Medical Unit and located near Roberts International Airport -- has treated 14 patients and is currently treating one, Warren said. The hospital is staffed by U.S. Public Health Service personnel and is intended to treat medical personnel exposed to the Ebola virus.

In addition to the hospital, a mobile lab began operating in Greenville, Liberia, Dec. 25, bringing the total number of mobile labs in Liberia to six.

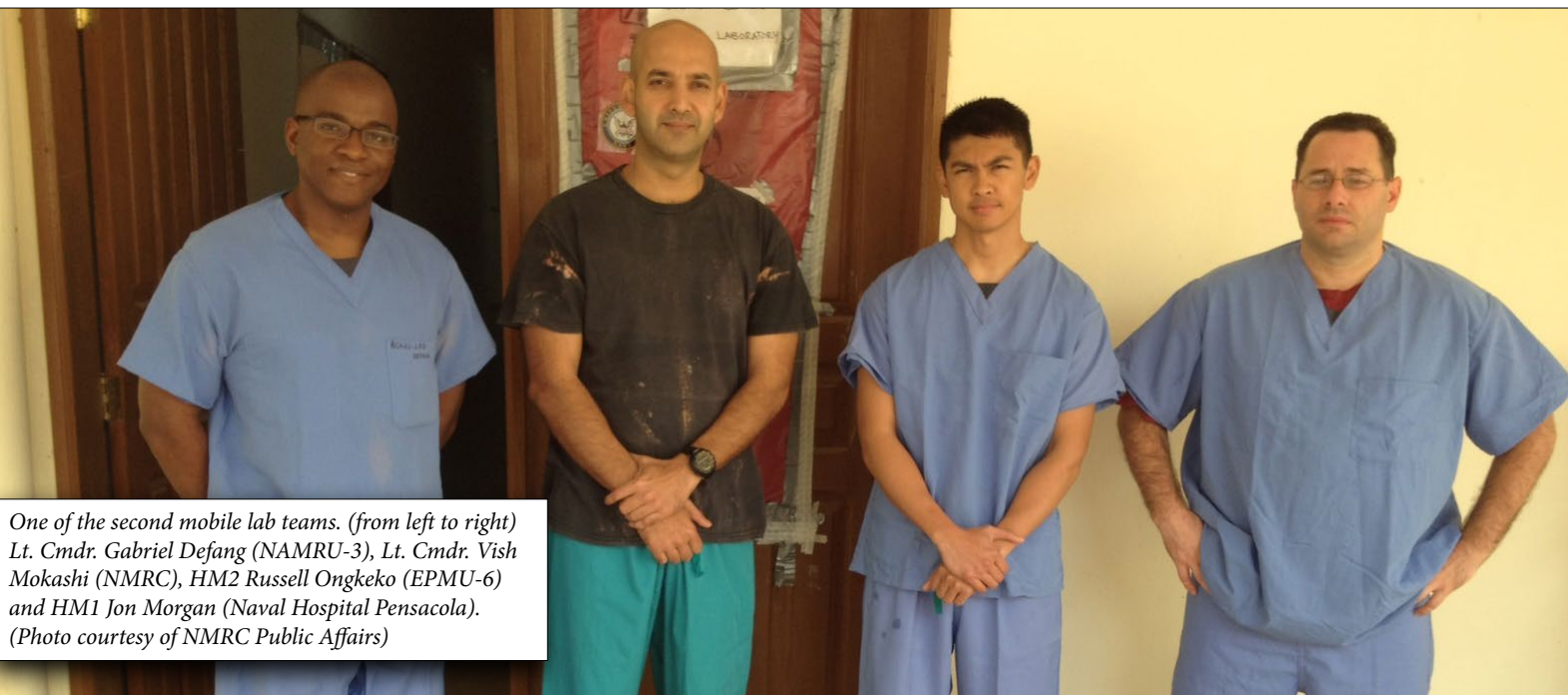
## Controlled Monitoring Program Review

Defense Secretary Chuck Hagel earlier approved an extension of a review of the 45-day monitoring plan for personnel who have traveled to Ebola-affected areas, Warren said. Army Gen. Martin

E. Dempsey, chairman of the Joint Chiefs of Staff, and other senior military leaders wanted to examine two complete controlled monitoring cycles before producing a comprehensive review of the program, the colonel said. A report of their findings is due to the defense secretary by Jan. 30, he added. About 450 personnel are undergoing controlled monitoring at four bases in the United States and one in Germany. -- Baumholder, Germany: 6 personnel, monitoring period ends Jan. 5; -- Joint Base Lewis-McChord, Washington: About 100 personnel, arrived Jan. 1; -- Joint Base Langley-Eustis, Virginia: About 100 personnel, arrived Jan. 1; -- Fort Hood, Texas: About 87 personnel, arrived Jan. 4; -- Fort Bliss, Texas: About 163 personnel, arrived Jan. 4.

## Ebola Response Costs

As of Jan. 5, DoD has contributed \$384.9 million to the Ebola response efforts. Operation United Assistance -- the military's logistical, training and engineering effort -- totals \$312.3 million, cooperative threat reduction measures -- biosurveillance and biosecurity -- total \$47 million, and research and development -- vaccine research -- totals \$25.6 million.



One of the second mobile lab teams. (from left to right) Lt. Cmdr. Gabriel Defang (NAMRU-3), Lt. Cmdr. Vish Mokashi (NMRC), HM2 Russell Ongkeko (EPMU-6) and HM1 Jon Morgan (Naval Hospital Pensacola). (Photo courtesy of NMRC Public Affairs)



# NAMRU-2 Trains Medics from the Royal Cambodian Navy

*Story courtesy of NMRC-Asia Public Affairs*

PHNOM PENH, Cambodia – For the past six months, four medics from the Royal Cambodian Navy (RCN), stationed at Ream Naval Base, have been undergoing an extensive Clinical Laboratory Training Program at the U.S. Naval Medical Research Unit - Two Detachment Phnom Penh (NAMRU-2 PP), to gain valuable knowledge and experience in clinical laboratory science.

“The training program will build the capacity of our RCN medics, and that is something we really need,” said Maj. Gen. Prom Satharath, Ministry of National Defense, General Department of Logistics and Finance, Department of Health, Deputy Director.

The training program includes the basics such as bacteriology, parasitology, urinalysis, immunology, chemistry, hematology and QA/QC.

“So far the four medics have been inundated with information, but for four guys who have had no real clinical laboratory training, they have done remarkably well,” said Lt. Cmdr. Dustin Harrison, a member of the training team and a microbiologist at NAMRU-2PP.

Harrison went on to add, this is a true crash course in clinical lab science designed to strengthen the capabilities of our RCN partners.

This capacity and capability building will be leveraged into other direct Mil-Mil collaborations, but for now the process has to begin somewhere. The Defense Threat Reduction Agency (DTRA) is helping NAMRU-2 PP achieve this goal.

Following completion of the training program, the four medics will return to Ream Naval Base, to



*Maj. Gen. Prom Satharath (left) stopped by NAMRU-2 PP recently to visit his four students from Ream Naval Base. (Photo taken by Megan Dethlefs)*

a new, fully-equipped laboratory created by NAMRU-2 PP to support the community of Sailors and their families that call Ream home.

NAMRU-2 PP will continue to mentor, support and track the progress of this clinic over the next several years. Additional projects with the Royal Cambodian Air Force (RCAF) and RCN include a surveillance project that is being expanded to provide coverage to over three quarters of the country and is focused on malaria, influenza and diarrhea.

Future malaria studies will assist the RCAF with efforts for malaria elimination in the country by 2025.

The U.S. Naval Medical Research Center – Asia (NMRC-A) is located in Singapore to work closely with distinguished Singaporean researchers with a focus on infectious disease

research of mutual interests. Building on a legacy of nearly 70 years of research in the region, Navy Medicine's global research and development efforts are focused on dedication, commitment and cooperation. NAMRU-2 PP is a detachment of NMRC-A.

NMRC-Asia supports U.S. interests in the Pacific theater. They conduct infectious diseases research, improve disease surveillance and outbreak response assistance for infectious diseases of critical public health importance to the U.S., and regional partners.

## R&D Chronicles

# Navy Medicine's Scientific Foundation

*Naval Medical School: The Armory of Scientific Learning* Part IV

By Andre B. Sobosinski, Historian, Bureau of Medicine and Surgery

***"Through the continuous operation of its educational and training activities, [the Naval Medical School] has contributed in full measure toward the maintenance of the health of the Navy and care of its sick and wounded."***

***~Rear Adm. Lamont Pugh, Navy Surgeon General, 1952***

The end of the Spanish American War marked the emergence of the United States as a global military power and the beginning of the Navy's long history in global health engagement.

At the start of the twentieth century, the U.S. Navy expanded into American Samoa (1900), Cuba (1903), Guam (1898), the Philippines (1905), Puerto Rico (1902), Territory of Hawaii (1898) and the Panama Canal Zone (1903); with these new ports came a host of endemic tropical illnesses with debilitating effects on military personnel.

Navy doctors, Hospital Corpsmen and nurses were now serving on the frontlines in the war against these diseases. The Navy's chief weapon in this fight was science; and in the early twentieth century, its scientific armory was the Naval Medical School.

The Naval Medical School had existed in various incarnations throughout the nineteenth century with the underlying purpose of preparing newly commissioned medical officers for life on the high seas. Over the years the focus of the school's curriculum would shift with the needs of the Navy.

The early emphasis on clinical training and surgery would gradually shift to the laboratory sciences. When it was reestablished at the Naval Museum of Hygiene in May 1902, it was a center of tropical medicine research and learning.

Under the tutelage of such tropical medicine pioneers like Edward Stitt, James Gatewood, Charles St. Butler and others, medical students investigated parasitic disease vectors, prevention techniques and clinical laboratory procedures.

*(continued on page 12)*



*The School consisted of a five-month course covering topics like microscopy, naval hygiene, military law, and a program of physical exercise and military drill akin to what any student might experience in a military school or service academy. BUMED Archives*



## Israeli Air Force Surgeon General Visits NAMRU-D

Story by Megan Mudersbach, NAMRU-D Public Affairs



NAMRU-D Commanding Officer Capt. Jeffrey Andrews (right) thanks Colonel Carmon, Surgeon General of Israeli Air Force for his visit, December 9, 2014. (Photo courtesy of NAMRU-D Public Affairs)

DAYTON, Ohio - The Naval Medical Research Unit-Dayton (NAMRU-D) at Wright-Patterson Air Force Base, Ohio, hosted Colonel Erez Carmon, Surgeon General of the Israeli Air Force, December 9, 2014. The tour was part of a broader visit to meet with Air Force and Navy Aerospace Medicine counterparts.

Aeromedical Director Dr. Richard Arnold took Carmon to NAMRU-D's hypoxia labs, spatial disorientation (SD) labs and fatigue countermeasures lab.

Mrs. Stephanie Warner and Dr. Leslie Drummond described NAMRU-D's joint investigations with the USAF 711th Human Performance Wing (711 HPW).

NAMRU-D is performing environmental altitude chamber testing of candidate gas and chemical sensors for integration into flight masks for hypoxia detection.

Dr. Hank Williams and Cmdr. Richard

Folga delivered briefs in the SD labs on the development and validation of SD simulator training scenarios research and capabilities. Folga focused on NAMRU-D's state-of-the-art disorientation research device capabilities regarding it as a link to effective Human System Integration.

The tour continued as Environmental Health Effects Director Dr. Michael Gargas guided Carmon through the inhalation lab, which is the largest inhalation toxicology research facility within Department of Defense. Next, Gargas directed Carmon to one of NAMRU-D's neurobehavioral labs and the neurophysiology lab.

Dr. Karen Mumy briefed Carmon on NAMRU-D's ability to perform a comprehensive battery of behavioral tests that measure a variety of performance areas.

Mumy discussed the neurophysiology abilities, specifically the Microelectrode array system (MED64). MED64 is ideal for brain slices or

cultured excitable cells, can record activity of multiple neurons and cells, and can simultaneously record from all 64 electrodes in an 8x8 array with an electrode diameter (20-50  $\mu\text{m}$ ), and spacing (150-200  $\mu\text{m}$ ).

NAMRU-D's Commanding Officer Capt. Jeffrey Andrews and Executive Officer Capt. Rees Lee, provided a short command brief preceding Carmon's tour of the two NAMRU-D research directorate laboratory facilities.

Carmon is board certified in Obstetrics and Gynecology and prior to his current assignment he served as the Israeli Navy Surgeon General in addition to various operational command and leadership positions during his military career.

# Navy Medicine's Scientific Foundation

*Naval Medical School: The Armory of Scientific Learning* Part IV

(continued from page 10)

The school's graduates would go on to vaccinate the native populations of American Samoa and Guam against smallpox in 1903 and 1905, respectively; help develop and administer anti-typhoid vaccinations (1912, ultimately stamping out the disease in the Navy and Marine Corps) partake in a host of international relief efforts working with civilian populations throughout multiple continents; and, serve as the Navy's first-line of defense against a host of deadly diseases, many of which few Western physicians had ever before seen.

Over the next decades the size and

scope of the school would continue to develop beyond the realm of tropical disease research.

Beginning in 1917, the school provided advance laboratory courses for enlisted medical personnel; and, by the 1920s offer course work for Navy nurses.

In World War II, the school would train more than 2,500 officers and enlisted personnel in epidemiology, malariology, tropical medicine, laboratory procedures, as well as pathology, photofluorography, and even medical art.

Many of the School's in-house artists would produce a host of educational

posters warning service personnel about the dangers of malaria, venereal disease and extolling proper sanitation procedures.

The Naval Medical School would operate out of the Old Observatory Building from 1902 until February 1942 when it, along with Naval Hospital Washington, D.C., relocated to Bethesda, Maryland.

The School would continue to operate under the banner of the National Naval Medical Center into the 1970s when it morphed into the Naval Health Sciences and Training Command (HSETC).

## Navy Researchers continue Overseas Collaborations at Deployment Sites in Kenya and Honduras

(continued from page 6)

Prevent TD will also be the first trial to take advantage of the IDCRPs TravMIL trial framework on which to overlay the trial procedures. The IDCRPs TravMIL protocol currently enrolls active duty personnel prior to deployment and uses stool and serum sampling, and volunteer diaries to collect exposure data to pathogens and other health threats while on travel.

Prevent TD will overlay a randomization step and rifaximin vs. placebo administration during the pre-deployment visit, and utilize the TravMIL protocol to obtain endpoint data for the efficacy determination. In the future, the TravMIL structure will continue to be used to evaluate a host of other prophylactic measures against travelers' diarrhea or other threats.

"At this time there is a lack of military specific treatment and prophylaxis

guidance against travelers' diarrhea, and there is much variability in practice patterns among military medical providers," said Gutierrez. "The goal of Prevent TD and TrEAT TD is to provide evidence from controlled, randomized trials from which to base military specific guidance."

Next summer, after the completion and initial review of results from TrEAT TD, the information will become available and a U.K.-U.S. treatment conference will be assembled to discuss and generate the first evidence-based treatment guidelines for military management of travelers' diarrhea.

While acute travelers' diarrhea infections resolve on their own in three to five days, half of those infected report decrease in job performance and one in ten will go on to develop post-infectious irritable bowel syndrome.

The Enteric Diseases Department's research program is centered on the development of effective countermeasures to prevent or abate bacterial diarrhea, with most efforts aimed at vaccine research and development.

The Enteric Diseases Department is organized into four closely integrated branches: Molecular Biology, Immunology, Biochemistry, and Clinical Trials. Principal investigators work with a number of extramural academic, industry and government partners to achieve the goal of developing new-generation vaccines against travelers' diarrhea.

In the realm of clinical trials, the WRAIR/NMRC facilities afford access to the WRAIR Pilot Bioproduction Facility for scale-up and manufacture of investigational vaccines and with a state-of-the-art outpatient clinical trials center where Phase I safety and immunogenicity trials are conducted.



# Naval Health Research Center Concludes Six-year Vaccine Study with FDA

Story by Anna Hancock, Naval Health Research Center Public Affairs



*Hospital Corpsman 1st Class Samuel Karr administers a smallpox vaccine to Gunner's Mate Seaman Brandon Tokarski during a ship-wide mass smallpox inoculation aboard the amphibious assault ship USS Makin Island (LHD 8). (U.S. Navy photo by Mass Communication Specialist 1st Class Sarah Murphy/Released)*

SAN DIEGO - The Naval Health Research Center (NHRC) recently concluded one of the largest vaccine safety studies in the command's history, contributing to the fourth and final phase of the U.S. Food and Drug Administration's (FDA) smallpox vaccine safety trials. For more than six years NHRC led the six military facilities across the nation taking part in this effort. About 16,000 samples were collected when the FDA decided NHRC's team had enough data to support the study.

"Even though the smallpox vaccine is an FDA approved vaccine, many vaccines undergo this post-marketing vaccine safety study [phase four]," said Lt. Cmdr. Lori Perry, a preventive medicine physician with NHRC and

the study's principal investigator. "It's an extra measure to track all potential adverse effects."

According to the Center for Disease Control and Prevention smallpox vaccine is safe and effective, and given to people determined to be at high risk for smallpox infection. Routine vaccination against smallpox stopped in 1972 after the disease was eradicated in the United States.

"Military service members still receive the vaccine if they are deploying to an area where the threat of smallpox is present," said Perry.

In collaboration with the FDA and the vaccine manufacturer Sanofi Pasteur, NHRC established vaccine surveillance sites at Marine Corps Base Twentynine

Palms, California; Fort Campbell, Kentucky; Fort Bliss, Texas; Fort Hood, Texas; Fort Stewart, Georgia, and Joint Base Lewis-McChord, Washington, in 2008. Since then, NHRC's teams diligently collected data each time a vaccine was administered, and closely monitored the health and well-being of the person who received it.

The data was then reported to the manufacturer and ultimately the FDA who has the final authority on the vaccine's safety.

"When we closed the surveillance sites down, it took the expertise from our quality assurance specialist and clinical trial program manager to ensure each applicable standard operating

*(continued on page 15)*



# Navy Medicine Training Support Center Tours NAMRU-SA Research Labs

Story courtesy of NAMRU-SA Public Affairs

SAN ANTONIO - Commanding Officer Navy Medicine Training Support Center (NMTSC) Capt. Denise Smith, visited the Naval Medical Research Unit - San Antonio (NAMRU-SA) for a briefing on the laboratory's mission and a hands-on tour of the lab's latest developments focused on the critical medical needs of providers and warfighters, December 4, 2014.

The tour began with Director of Combat Casualty Care and Operational Medicine (CCC&OM) Directorate Dr. John Simecek, where he provided an overview of the science projects and an introduction to the diverse and uniquely skilled scientific team members.

The research discussion ranged from hemorrhage and resuscitation treatments to blood replacement products.

Of particular interest to Smith was the presentation given by Biomedical Engineer and Principal Investigator Mr. Roy Dory, regarding NAMRU-SA's latest developments in tourniquet research, including functional tourniquets.

Dory explained how testing and evaluation conducted at NAMRU-SA supports joint systems and material commands to ensure treatment modalities are effective in operational settings.

He also pointed out that testing protocols incorporate medical and non-medical users in the evaluation to ensure utility and effectiveness in actual field settings.

Head of the Maxillofacial Injury



*Capt. Denise Smith, NMTSC Commanding Officer (left) learns about NAMRU-SA's latest developments in tourniquet research from Mr. Roy Dory, Biomedical Engineer and Principal Investigator. Mr. Dory describes how different devices were assessed for their utility in different battlefield situations, as well as ease of application, and functionality. (Photo courtesy of NAMRU-SA Public Affairs)*

and Disease Department Capt. Jonathan Stahl, discussed the lab's newest research device, the Electrospinner. Smith was able to see the electrospinner in action as it spun a nano-fibrous wound dressing out of a polymer solution. Stahl handed Smith a piece of the tissue-looking material and pointed out the fibers under a microscope, and discussed how the wound dressing is imbedded with growth factors to aid in healing and reduce facial scarring. The two also discussed the applicability for using the engineered tissue on other parts of the body.

Nanomaterial Expert and Principal Investigator Dr. Mauris DeSilva, described how his interdisciplinary team of researchers is designing a cranial implant coating and reengineering implant surface

characteristics in an effort to reduce postoperative infections in patients with traumatic injuries in the craniofacial region.

The coating's goal is to provide antibacterial properties for 10-14 days, the critical infection period, and as a second line of defense, the implant surface is being re-engineered to discourage bacterial colonization.

Valuable results from success in this research include a decreased need for multiple surgeries, expedited path to recovery and significantly improved patient outcomes.

Also, Head of the Biomaterials and Environmental Surveillance Department and Principal Investigator Dr. Amber Nagy,

*(continued on page 15)*



## Naval Health Research Center Concludes Six-year Vaccine Study with FDA

(continued from page 13)

procedure was followed,” said Perry. “Every detail to safeguard personally identifiable information and ensure patient privacy was accounted for.”

This month, NHRC’s team is carrying out the administrative details in the turnover to its collaborative partners. This work will continue until the summer of 2015, but for now, NHRC’s Commanding Officer Capt. Jacqueline Rychnovsky lauds the team responsible for executing the study.

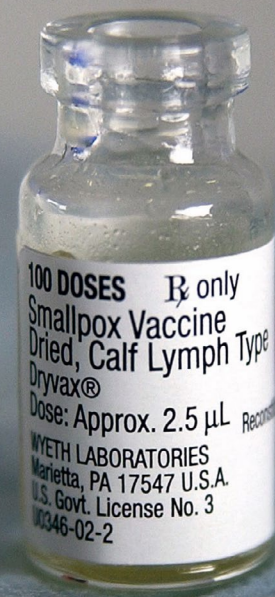
“This study directly contributed to the safety and readiness of our service men and women,” said Rychnovsky. “We appreciate the collaborative efforts from our Army, Marine Corps and Air Force counterparts at the surveillance sites. Their roles were integral to the

success of the study.”

As the DoD’s premier deployment health research center, NHRC’s cutting-edge research and development is used to optimize the operational health and readiness of the nation’s armed forces.

Within close proximity to more than 95,000 uniformed service members, world-class universities, and industry partners, NHRC’s expert team sets the standards in joint ventures, innovation and practical application.

*A vial of the Smallpox vaccine used to inoculate the crew of USS Constellation as part of the fleet’s “Forward Deployed” vaccination program. (U.S. Navy photo by Photographer’s Mate 2nd Class Felix Garza Jr.)*



## Navy Medicine Training Support Center Tours NAMRU-SA Research Labs

(continued from page 14)

elaborated on NAMRU-SA’s capabilities as the lead agent for mercury abatement efforts for the Navy.

The goal of the program is to reduce mercury release from Navy medical and dental treatment facilities into public wastewater streams. To this end, the Navy patented the DD2011 chairside amalgam separator.

The DD2011 is currently used in all Navy dental facilities and is installed and maintained by the dental clinic Bio-Medical Engineering Technician (BMET). Nagy and her team showed Smith an enhanced filter design.

The Environmental Protection Agency

has proposed a new, lower amalgam standard for wastewater streams (99 percent filtered), necessitating a change to the current 95 percent effective filter system. Smith pointed out that the operation of the filter and its maintenance are a part of the BMET training program and that the new information would be important for future curriculum updates.

As the tour concluded, Simmons said, “During this visit we wanted Capt. Smith to see we have strong interdisciplinary expertise, a wide range of capabilities, and a focus on biomedical research to support Navy medical personnel and warriors on sea and on land.”

Smith had a keen interest in the

combat casualty care and craniofacial health research, specifically, how the new devices and techniques could be integrated into the medical student training curricula.

The Army, Air Force and Navy relocated all enlisted medical training to Joint Base, Ft. Sam Houston in 2010 to facilitate an integrated approach to training with the goal of seamless care on the joint battlefield.

The tour enabled excellent discussion on how the research laboratory could incorporate field experienced instructors into the design, testing, and evaluation phases to get the best products to end users.

## Greeting from the NMRC Ombudsman!

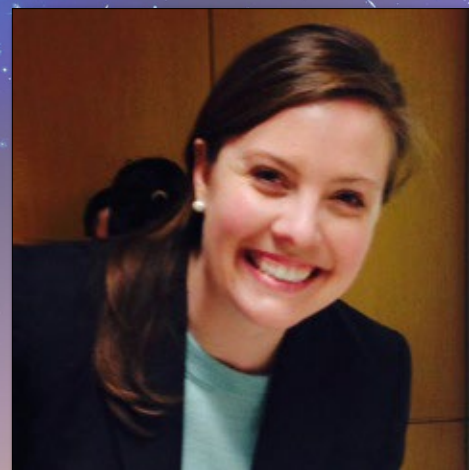
Happy New Year! As some of you know, my husband and I recently welcomed our first child into the world, so 2015 is full of new possibilities for us. But having a major life event occur isn't the only reason to welcome the New Year.

I've always liked New Year's celebrations; maybe that's just the optimist in me. A new year signifies a fresh start and a chance to once again try to become a better version of myself. Sure, you say – there are always the same old resolutions we make year after year only to forget them two weeks in and revert back to old habits. But these resolutions we make are often inward focused – work out more, eat less. Perhaps that's why we fail at them year after year. I have a different suggestion for this year – resolve to see the world with new eyes and a fresh perspective.

Don't approach the problems from 2014 with the same old solutions and hope for new results in 2015. Resolve to grow in your relationships, promote positivity and inclusiveness in your work environments, be genuine, and do something that scares you (and not in the defying death sort of way).

Perhaps then, we'll see true personal growth in ourselves and it will have nothing to do with a scale or the latest diet.

From My family to Yours, Allison Norris



2015  
Happy New Year

Naval Medical Research and Development Enterprise laboratories now have a landing page portal that provides basic information on all laboratories, links to respective websites and contact information. Additionally, general information on each laboratory is provided.



### Naval Medical Research and Development *Enterprise Laboratories*

Home Enterprise ▾ Laboratories ▾ Collaboration ▾ News ▾ Research ▾ Resources ▾

Naval Medical Research and Development  
Enterprise Laboratories

*"The outstanding science we do as part of Navy Medicine's Research and Development Enterprise makes our military, the U.S. and the world safer and stronger."—CAPT John W. Sanders III, MC, USN*